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10/781,323

02/18/2004

Paul Mantz

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EXAMINER

OKEZIE, ESTHER O

ART UNIT	PAPER NUMBER
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3652

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05/11/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/781,323

Applicant(s)

MANTZ, PAUL

Examiner

Esther O. Okezie

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-100 is/are pending in the application.
- 4a) Of the above claim(s) 21-32 and 47-100 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-17, 19, 33-40, 42 and 44-46 is/are rejected.
- 7) ☒ Claim(s) 8, 19, 20, 41 and 43 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1,3-7,9-16,19,33-40,42,45, and 46 are rejected under 35 U.S.C.

103(a) as being unpatentable over Woodruff et al. US Patent Application

Publication 2003/0085582.

2. Re claims 1 and 6, Woodruff et al. discloses an endeffector for handling semiconductor wafers comprising: a base member (base 310) having proximal end and distal end, the base member having a top surface configured to receive a semiconductor wafer; a plurality of support members (322) located on the top surface of the base member, the plurality of support members being configured to contact a wafer received on the top surface (see figs. 12A-14); a pushing device (354) for positioning a wafer on the base member, the pushing device comprising a retractable piston (352) configured to contact an edge of the a semiconductor wafer, the piston being moveable between an extended position and a retracted position; a biasing member (380) placed in association with the piston, the biasing member biasing the piston towards its extended position; and

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a pneumatic actuator (350) in operative association with the piston, the pneumatic actuator being configured to receive pressurized gas (paragraph 77).

Woodruff et al. discloses the biasing member urges or biases the piston towards engagement with the wafer to an extended position to urge the piston away toward the wafer if pneumatic pressure is lost (see paragraph 77).

Woodruff et al. does not disclose the alternative including the biasing member biasing the piston away from the workpiece to a retracted position so that pneumatic pressure is used to overcome the biasing force and retract the piston away from the wafer. It would have been obvious to one of ordinary skill in the art at the time of the invention to bias the biasing member in the opposite direction from the retracted position to the extended position since it has been held that a mere reversal of essential working parts of a device involves routine skill in the art.

3. Re claims 3-5, Woodruff et al. discloses a contact element (354) having a convex shaped surface positioned at the end of the piston (352) for contacting a semiconductor wafer (figs 6-8); wherein the piston is maintained in a bearing assembly positioned downstream from the pneumatic actuator (fig. 11); the biasing member comprises a spring (paragraph 77).

4. Re claims 7, 9, and 10, Woodruff et al. discloses the pneumatic actuator (350) is connected to a first gas line (580) and a second gas line (586), the actuator including a driving member (driver 380), the first gas line being configured to feed a gas into the pneumatic actuator for moving the driving member out of the pneumatic actuator and the second gas line being configured

to feed gas into the pneumatic actuator for retracting the driving member, the driving member being connected to the piston (paragraph 64; figs. 10 and 11); at least one position sensor (390) for sensing the position of the piston; the pushing device is positioned at the proximal end of the base member (fig. 6).

5. Re claims 11, 12, 33,34, and 36 Woodruff et al. do not disclose the height of the endeffectors. Woodruff et al. discloses the end effectors can be spaced apart by specific distances in order move the wafers in a processing chamber. It would have been obvious to one of ordinary skill in the art at the time of the invention to make the end effector an adequate size to be able to pick up conventionally sized wafers and transport them in a processing chamber.

6. Re claims 13-16 and 19, Woodruff et al. discloses at least one backstop member (324) located on the base member generally opposite the pushing device, wherein the backstop member has a height sufficient for a wafer to be held between the backstop member and the piston when the piston is at least partially extended (paragraph 70); the biasing member and pneumatic actuator are contained in a housing defined by the base member (fig. 6-11);

7. Re claims 35 and 37-40, Woodruff et al. discloses a pushing device (354) located at the proximal end of the base member, the pushing device comprising a retractable piston (352) configured to contact an edge of a semiconductor wafer for positioning the wafer on the base member (fig 6-8); plurality of support members (322) are shaped to only contact the edge of the wafer; the support members comprise a surface configured to only contact an edge of the semiconductor wafer, the surface having convex and eccentric shape (figs

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12A-14); the base member includes a first tine (312a) spaced from a second tine (312b) in a forked arrangement, the first and second tines terminating at the distal end of the base member, the support members having convex and eccentric surface being positioned at the distal end of each tines (fig. 6); further comprising backstop members (324) surrounding the support members located on the first tine and the second tine at the distal end of the base member, the backstop members having a height greater than the support members (see fig. 14).

8. Re claim 42, Woodruff et al discloses a pneumatic actuator (350) in operative association with the piston (352) of a pushing device, the pneumatic actuator being configured to receive pressurized gas (paragraph 77). Woodruff et al. discloses the biasing member urges or biases the piston towards engagement with the wafer to an extended position to urge the piston away toward the wafer if pneumatic pressure is lost (see paragraph 77). Woodruff et al. does not disclose the alternative including the biasing member biasing the piston away from the workpiece to a retracted position so that pneumatic pressure is used to overcome the biasing force and retract the piston away from the wafer. It would have been obvious to one of ordinary skill in the art at the time of the invention to bias the biasing member in the opposite direction from the retracted position to the extended position since it has been held that a mere reversal of essential working parts of a device involves routine skill in the art.

9. Re claim 45 and 46, Woodruff et al. does not disclose from what material the support members and the base are made. It would have been obvious to one

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of ordinary skill at the time of the invention to make the support members and base from a suitable material since it has been held within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use.

10. Claims 1-6,10-17,19,33,34-40, and 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi et al. US 6,275,748.

11. Re claims 1 and 6, Bacchi et al discloses an endeffector for handling semiconductor wafers comprising: a base member (10) having proximal end and distal end, the base member having a top surface configured to receive a semiconductor wafer; a plurality of support members (24,26) located on the top surface of the base member, the plurality of support members being configured to contact a wafer received on the top surface; a pushing device for positioning a wafer on the base member, the pushing device comprising a retractable piston (52) configured to contact an edge of the a semiconductor wafer, the piston being moveable between an extended position and a retracted position; a biasing member (155) placed in association with the piston, the biasing member biasing the piston towards its extended position; and a vacuum pressure actuator (151) in operative association with the piston, the vacuum pressure actuator being configured to receive vacuum pressure from a vacuum chamber source (160; paragraphs 76 and 77).

Bacchi et al. discloses a vacuum suction device for moving the piston in order to suction gas out of the chamber to reciprocate the piston. Bacchi et al.

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does not disclose the alternative of moving the piston by providing pneumatic gas produced by a pneumatic actuator. Woodruff et al. discloses reciprocating a piston into engagement with a wafer on an end effector. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Bacchi et al as taught by Woodruff et al. to provide pneumatic pressure instead of vacuum suction in order to extend the piston against the force of the spring.

Bacchi et al. discloses the biasing member (spring 155) urges or biases the piston towards engagement with the wafer to an extended position and vacuum pressure retracts the piston. Bacchi et al. does not disclose the alternative including the biasing member biasing the piston away from the workpiece to a retracted piston so that pneumatic pressure is used to overcome the biasing force and retract the piston away from the wafer. It would have been obvious to one of ordinary skill in the art at the time of the invention to bias the biasing member in the opposite direction from the retracted position to the extended position since it has been held that a mere reversal of essential working parts of a device involves routine skill in the art.

12. Re claims 2,4,5, et al. discloses a contact element (50) having a flat surface positioned at the end of the piston for contacting a semiconductor wafer; wherein the piston is maintained in a bearing assembly (154) positioned downstream from the actuator (fig. 11), the bearing assembly preventing particles generated during the movement of the piston from contacting a semiconductor

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wafer held on the base member (bore 154 is sealed with airtight seals 158); the biasing member comprises a spring (155).

13. Re claim 10, Bacchi et al. discloses the pushing device is positioned at the proximal end of the base member (fig 2; col. 10, lines 8-19).

14. Re claims 11,12,33,34 and 36, Bacchi et al. does not disclose the height of the endeffector. Bacchi et al. does disclose the end effector is adapted for retrieving and replacing wafers from closely spaced apart wafer cassettes (14) and is so shaped to be slender enough to fit between close spaced wafers (col. 10, lines 8-19). It would have been obvious to one of ordinary skill in the art at the time of the invention to design the end effector according to dimensions for passing between closely space wafer cassettes.

15. Re claims 13,14,16,17,19, Bacchi et al. discloses at least one backstop member (34) located on the base member generally opposite the pushing device, wherein the backstop member has a height sufficient for a wafer to be held in between the backstop member and the piston when the piston is at least partially extended (figs 3,4,8); the base member includes a first tine (188) spaced from a second tine (190), the first and second tines terminating at the distal end of the base member, each of the tines including at least one backstop member (134); the biasing member and the pneumatic actuator are contained in a housing (airtight bore 154) defined by the base member (fig 8); at least certain of the support members (arcuate rest pads 124,126) comprise a surface configured to only contact an edge of a semiconductor wafer, the surface having a convex and eccentric shape (col. 8, lines 41-57; fig 9); a wafer detection system (214)

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comprising a light sending pathway (244) positioned opposite a light receiving pathway (240) across the base member, the light sending pathway being configured to emit a light beam towards the light receiver pathway, and wherein the wafer detection system is configured to detect the presence of a wafer when the light beam is intersected by the wafer (fig 14); a pair of backstop members (134) are positioned at the end of each tine, each pair of backstop members surrounding a corresponding support member (124), each backstop member having a height greater than the height of the corresponding support member (figs 3 and 4).

16. Re claims 35,37-40, and 44, Bacchi et al discloses a pushing device located at the proximal end of the base member, the pushing device comprising a retractable piston (52) configured to contact an edge of a semiconductor wafer for positioning the wafer on the base member; plurality of support members (24,26) are shaped to only contact the edge of the wafer; the support members comprise a surface configured to only contact an edge of the semiconductor wafer, the surface having convex and eccentric shape (fig. 2,4, and 9); the base member includes a first tine (188) spaced from a second tine (190) in a forked arrangement, the first and second tines terminating at the distal end of the base member, the support members having convex and eccentric surface being positioned at the distal end of each tines; further comprising backstop members (134) surrounding the support members located on the first tine and the second tine at the distal end of the base member, the backstop members having a height greater than the support members (see fig. 3 and 4); a wafer

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detection system (214) comprising a light sending pathway (244) positioned opposite a light receiving pathway (240) across the base member, the light sending pathway being configured to emit a light beam towards the light receiver pathway, and wherein the wafer detection system is configured to detect the presence of a wafer when the light beam is intersected by the wafer (fig 14)

17. Re claims 45 and 46, Bacchi et al. does not disclose from what material the support members and the base are made. It would have been obvious to one of ordinary skill at the time of the invention to make the support members and base from a suitable material since it has been held within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use.

Allowable Subject Matter

Claims 8,18,20,41, and 43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Esther O. Okezie whose telephone number is (571) 272-8108. The examiner can normally be reached on Mon-Fri 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gene O. Crawford can be reached on (571) 272-6911. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EOO 4/20/07


GENE O. CRAWFORD
SUPERVISORY PATENT EXAMINER